

Proposed FY 2017 Field Work Summary - Construction Preparation

- Perform detailed dam complex survey and inspection.
 - This will document the current conditions of the dams and obtain more detailed information on the existing beaver dam/pond complex.
- Establish alluvial material erosion and transport control measures and stormwater BMPs throughout work area.
- Dewater Beaver Ponds 3, 4, 5 and divert Leviathan Creek flow around these ponds using temporary piping similar to previous work in beaver ponds.
 - Diverted water will discharge into Beaver Pond 2 to allow settling of material suspended during diversion.
 - Energy dissipation methods such as rip rap placement may be used as necessary at the pipe outlet.
- Information obtained from this FFS will be used to inform the evaluation of risk from these conditions and remedial alternatives in the Feasibility Study (FS), and these remedial technologies may be integrated as components of the final site remedy.

Proposed FY 2017 Field Work Summary – Access & Gabion Dam Construction

- Construct temporary access road near Beaver Dam 5 at washed out haul road to cross to the west side of the creek in order to perform construction activities.
 - Temporary access may involve placement of crane mats or similar if pond can be completely dewatered, or placement of a temporary culvert and clean fill material to allow equipment crossing.
- Construct lower elevation, flow-through gabion dams just downstream of Beaver Dams 3 and 5, only high enough to retain sediment behind existing dams.
 - Lower elevation gabion dams will significantly reduce the impounded water volumes behind these dams. Beaver Dam 4 will be eliminated entirely.
 - Gabions used for dam construction are anticipated to measure only 2-3 feet high, significantly smaller than the existing beaver dams.
 - Gabions will be constructed of 316L stainless steel or PVC coated steel for improved durability.

Proposed FY 2017 Field Work Summary – Existing Dam Removal

- Remove Beaver Dams 3, 4 and 5 using typical construction equipment such as backhoes or excavators.
 - Woody debris removed from the dam locations will be hauled off-site for disposal or stockpiled for future disposal.
- Remove dewatering and diversion controls to allow flow to resume in Leviathan Creek.

Proposed FY 2017 Field Work Summary – Test Plot Establishment and Monitoring

- Establish 8-10 test plots in the exposed alluvial areas exposed from the reduction of impounded water volume behind gabion dams constructed.
 - Test plots will be used to study effectiveness of various methods for armoring or stabilizing alluvial material from erosion and downstream migration.
 - Rip rap with filter blanket, direct seeding, seeding using biodegradable erosion control mat, seeding using synthetic erosion control mat.
 - Test plots will each measure approximately 8 feet wide by 20 feet long, and are anticipated to be located where Beaver Pond 5 previously impounded water.
- Perform qualitative and quantitative monitoring of the test plots, remaining dams and constructed gabion dams.
- Gabion dams will need to be monitored and beaver activity controlled per existing depredation permits issued to USFS and LRWQCB in 2016.

Beaver Dam Locations to be Removed



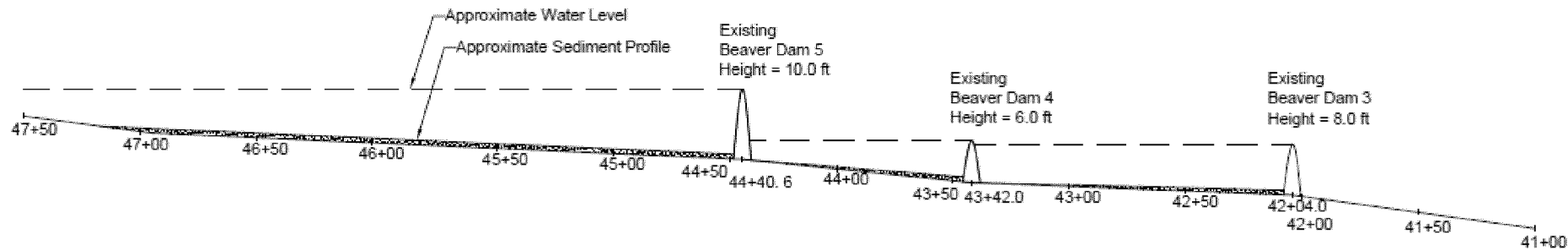
- Beaver Dams 3, 4, and 5 are currently planned for removal.
- Beaver Dams 3 and 5 will be replaced by lower elevation, flow-through gabion dams.
- Beaver Dam 4 will not be replaced as stored alluvial material from behind the dam will be retained behind the new downstream gabion dam, as well as Beaver Dams 1 and 2.

Estimated Beaver Pond Volumes

| Pond No. | Approximate Pond Volume (ft ³) | Approximate Pond Volume (gallons) |
|----------|--|-----------------------------------|
| 1 | 300 | 2,300 |
| 2 | 4,200 | 31,700 |
| 3 | 27,000 | 202,100 |
| 4 | 34,100 | 254,900 |
| 5 | 65,200 | 487,700 |
| 6 | 2,000 | 15,200 |
| 7 | 1,300 | 9,500 |
| 8 | 6,600 | 49,500 |
| 9 | 4,900 | 36,700 |
| 10 | 1,100 | 8,300 |
| 11 | 1,200 | 9,100 |
| 12 | 6,500 | 48,600 |
| 13 | 2,600 | 19,800 |
| 14 | 13,000 | 97,000 |
| 15 | 400 | 3,200 |
| 16 | 1,600 | 12,000 |
| 17 | 10900 | 81,400 |
| 18 | 4,200 | 31,600 |
| 19 | 200 | 1,600 |
| 20 | 7,800 | 58,600 |
| 21 | 6,900 | 51,300 |
| 22 | 0 | 0 |
| 23 | 1,200 | 9,200 |
| 24 | 1,500 | 11,300 |
| 25 | 2,400 | 17,600 |
| 26 | 5,000 | 37,400 |
| 27 | 8,100 | 60,800 |
| 28 | 900 | 7,000 |
| TOTALS | 221,100 | 1,655,400 |

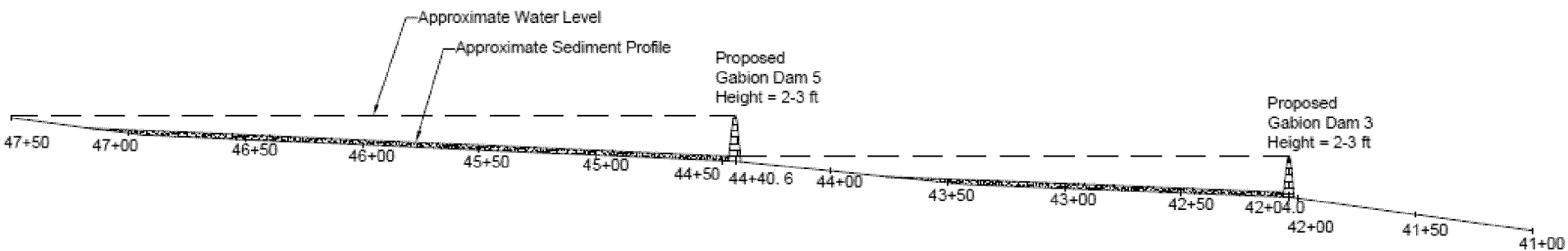
- Beaver Dams 3, 4, and 5 currently impound 944,700 gallons, 57% of the total impounded water in the beaver dam/pond complex.
- Replacement of Beaver Dams 3, 4 and 5 with lower elevation gabion dams will result in reducing impounded water volumes in those locations by ~92%, and overall will reduce the impounded water volume in the beaver dam/pond complex by ~52%.
- Removal of Beaver Dams 3, 4 and 5 will reduce the stored woody debris volume in the complex by approximately 30%.

Current Conceptual Site Model



| Location | Station (ft.) | Invert Elevation (ft. NAVD88) | Estimated Existing Dam Elevation (ft. NAVD88) | Estimated Existing Dam Height (ft.) |
|--------------|------------------|-------------------------------------|--|--|
| Beaver Dam 3 | 4204.0 | 6655.0 | 6663.0 | 8.0 |
| Beaver Dam 4 | 4342.0 | 6656.8 | 6662.8 | 6.0 |
| Beaver Dam 5 | 4440.6 | 6660.1 | 6670.1 | 10.0 |

Planned Conceptual Site Model



| Location | Station (ft.) | Invert Elevation (ft. NAVD88) | Estimated Proposed Dam Elevation (ft. NAVD88) | Estimated Proposed Dam Height (ft.) |
|--------------|------------------|-------------------------------------|---|--|
| Gabion Dam 3 | 4204.0 | 6655.0 | 6657-6658 | 2-3 |
| Gabion Dam 5 | 4440.6 | 6660.1 | 6662-6663 | 2-3 |

Gabion Dam Example



Reference: <http://www.gabionproducts.com/info.php?id=67&u=223>